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Re-evaluation Note REV2010-12

Chloropicrin – Proposed Mitigation Measures

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1.0 Background

Chloropicrin is under re-evaluation by Health Canada's Pest Management Regulatory Agency (PMRA), and is one of the active ingredients included in the soil fumigant cluster. The purpose of this Re-evaluation Note is to notify registrants, pesticide regulatory officials, and the Canadian public of proposed label amendments for the products containing chloropicrin.

Common Name	Chemical Name	CAS Registry Number
	International Union of Pure and Applied Chemistry (IUPAC) and Chemistry Abstracts Service (CAS)	
Chloropicrin	Thrichloronitromethane	76-06-2

Chloropicrin is a non-selective pre-plant soil fumigant and antimicrobial used to control pathogens including insects, nematodes, fungi and weeds. In Canada, chloropicrin is currently registered for use as a soil fumigant on terrestrial and greenhouse food/feed and non-food/non-feed crops, forests/woodlots, ornamentals and turf. End-use products formulated as liquids or solutions are applied and incorporated into soil as a broadcast or row treatment using chisels. The soil is sealed using a tarp, roller or press sealer, and is aerated prior to planting. Chloropicrin is also used as a wood preservative to treat structural timber (such as poles). The end-use product is a pressurized liquid which is injected into pre-drilled holes and sealed with treated wood plugs. Appendix I lists all currently registered products in Canada for chloropicrin.

2.0 Proposed Regulatory Strategy

The PMRA is requiring registrants of products containing chloropicrin to implement mitigation measures to limit user exposure and to further protect bystanders and the environment. The implementation of these measures is considered a first step in the re-evaluation of the Canadian uses of the products containing chloropicrin.

The measures are consistent with measures adopted by the United States Environmental Protection Agency (USEPA) in their Re-registration Eligibility Decision (RED) documents (2008) and amended RED documents (2009) for chloropicrin, and the USEPA Fumigant Management Plans and Postapplication Summary Reports Fact Sheet (2010). These mitigation measures are also intended to increase consistency across all Canadian product labels. The PMRA is aware that the USEPA assessment of chloropicrin is ongoing, and may re-assess as required.

The proposed mitigation measures include the requirement for a site-specific Fumigation Management Plan prior to any fumigation with chloropicrin. The registrants are required to develop, in consultation with the PMRA, a product stewardship program for the soil fumigant uses of chloropicrin. A key component of the stewardship program is the development of a Fumigation Management Plan guidance document. It is proposed that this Fumigation Management Plan guidance document be part of an applicator's manual distributed with the product.

The present Re-evaluation Note addresses the proposed label amendments for the end-use products containing chloropicrin, as well as the Fumigation Management Plan requirements for the soil fumigant uses. Appendix II lists all required label amendments for products containing chloropicrin. Appendix III outlines the minimum requirements that must be included in the Fumigation Management Plan.

3.0 Supporting Documentation

PMRA documents are available through the Pest Management Information Service, phone: 1-800-267-6315 within Canada or 1-613-736-3799 outside Canada (long distance charges apply); fax 613-736-3798; e-mail pmra.infoserv@hc-sc.gc.ca.

The USEPA RED documents for chloropicrin are available on the Office of Pesticide Programs' website at www.epa.gov/pesticides/reregistration.

4.0 Next Steps

The PMRA will accept written comments on this proposal up to 60 days from the date of publication of this document. Please forward all comments to Publications (please see contact information indicated on the cover page of this document). The PMRA will consider all comments received from the public in response to this consultation document, and will then publish a follow-up document which will include implementation details.

Appendix I List of products currently registered for chloropicrin as of 31 January 2010.

Registration Number	Marketing Class	Registrant	Product Name	Formulation Type	Registered Use Type	Guarantee
19051	Technical	Dow AgroSciences Canada Inc.	Chloropicrin Technical Herbicide	Liquid	-	99%
25669	Technical	Trinity Manufacturing, Inc.	Chloropicrin Technical	Liquid	-	99%
13477	Restricted	Great Lakes Chemical Corporation	Terr-o-gas 67 Preplant Soil Fumigant	Liquid	Soil fumigant	31.8%
25863	Restricted	Hendrix and Dail, Inc.	Chloropicrin 100 Liquid Soil Fumigant	Liquid	Soil fumigant	99%
28715	Restricted	Hendrix and Dail, Inc.	Pic Plus Fumigant	Solution	Soil fumigant	85.1%
14588	Commercial	North Star Structural Contractors, Ltd.	Timber Fume	Pressurized product	Antimicrobial	99%
16324[a]	Commercial	Dow AgroSciences Canada Inc.	Telone C-17 Liquid Soil Fungicide & Nematicide	Solution	Soil fumigant	16.5%

[a] To be discontinued.

Appendix II Proposed Label amendments for products containing chloropicrin.

All end-use products containing chloropicrin for soil fumigant uses must be classified as Restricted Class Products. The label amendments presented below do not include all label requirements for individual end-use products, such as first aid statements, disposal statements, precautionary statements and supplementary protective equipment. Additional information on labels of currently registered products that contradicts the amendments noted below should be removed from the labels.

The labels of products in Canada containing chloropicrin must be amended to include the following statements to further protect workers, bystanders and the environment.

Restricted and Commercial Class Products

1. Restricted Classification

The following statements must be included on the primary display panel of the labels registered for soil fumigant uses:

> RESTRICTED PRODUCT
>
> READ THE ENTIRE LABEL AND GUIDANCE FOR PREPARATION OF A FUMIGATION MANAGEMENT PLAN BEFORE USING
>
> THIS PRODUCT CAN ONLY BE USED IN CONJUNCTION WITH A DETAILED FUMIGATION MANAGEMENT PLAN

The following statements must be included in the NATURE OF RESTRICTION section of the labels registered for soil fumigant uses:

> This product is only to be used by individuals holding an appropriate pesticide applicator certificate or license recognized by the provincial/territorial pesticide regulatory agency where the pesticide application is to occur.
>
> This product is accompanied by an approved label and Guidance for Preparation of a Fumigation Management Plan. READ AND UNDERSTAND THE ENTIRE LABELLING.

2. Fumigation Management Plans

The following statements must be included on labels registered for soil fumigant uses in a section entitled FUMIGATION MANAGEMENT PLAN:

> A Fumigation Management Plan is an organized, written description of the required steps involved to help ensure a safe, legal and effective fumigation.
> The supervising fumigant handler is responsible for working with the owners and/or responsible employees of the site to be fumigated to develop and follow a Fumigation Management Plan. All plans should reflect the experience and expertise of the applicator and circumstances at and around the site and/or area.
>
> In addition to the plan, the applicator must read the entire label and the Applicator's Manual, and follow its directions carefully. If the applicator has any questions about the development of a Fumigation Management Plan, contact the supplier for further assistance.
>
> The Fumigation Management Plan and related documentation, including monitoring records, must be maintained for a minimum of 2 years.
>
> Before any fumigation begins, handlers must be familiar with and comply with all local/provincial/territorial/federal laws and regulations.

3. Label amendments pertaining to basic hygiene for all end-use products

Add to PRECAUTIONS:

> Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
>
> Remove clothing immediately if pesticide comes in contact with skin through soaked clothing or spills. Then wash skin thoroughly and put on clean clothing. Wash contaminated clothing separately from other clothes before reuse.
>
> Store personal protective equipment out of reach of children and pets.
>
> Avoid touching 'clean' surfaces while wearing personal protective equipment (for example: steering wheel, door handles, counter tops), or thoroughly clean these surfaces afterwards with water and detergent.

Remove personal protective equipment immediately after handling this product. Remove personal protective equipment in a pre-determined area separate from living or working areas.

Wash the outside of the gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Avoid touching eyes and face until you have washed your hands.

Never use the mouth to siphon product from containers or to blow out clogged lines, nozzles, etc.

Respirators should be stored in a sealed plastic bag until the next use, to preserve the life of the filter. Regularly change respirator cartridge filters.

Repair/replace torn or broken personal protective equipment.

Treat all clothing worn during pesticide use as contaminated, and handle with chemical resistant gloves.

Use hot water, heavy-duty liquid detergent, the highest water level setting, and the longest wash cycle. Keep and wash personal protective equipment separately from other laundry.

If heavily soiled, wash personal protective equipment two or three times. After washing, run the washing machine through a complete cycle with detergent. If possible, line-dry the clothing.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers must be in the area during application.

4. Label amendments and user safety requirements to further protect workers and bystanders

Add to PRECAUTIONS:

For the antimicrobial product (current registration number 14588):

Wear a long-sleeved shirt, long pants, shoes plus socks, chemical-resistant gloves, and a respirator during mixing, loading, transfer,

application or any other handling activities. The respirator must be a NIOSH-approved full-face, or helmet/hood style respirator with either, an organic-vapour-removing cartridge with a pre-filter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G). The respiratory protection must fit properly, any obstruction to a proper fit should be removed (for example, beard, long sideburns).

For all the soil fumigant products:

Persons engaged in any of the following activities are defined as fumigant handlers:

- persons participating in the application as supervisors, loaders, drivers, tractor co-pilots, shovelers, cross ditchers, or as other direct application participants (application starts when the fumigant is first introduced into the soil and ends after the fumigant has stopped being delivered/dispensed/injected to the soil);
- persons using devices taking air samples to monitor fumigant air concentrations;
- persons cleaning up fumigant spills (this does not include emergency personnel not associated with the fumigation application);
- persons handling or disposing of fumigant containers;
- persons cleaning, handling, adjusting, or repairing the parts of fumigation equipment that may contain fumigant residues;
- persons installing, repairing, operating equipment in the fumigant application block or surrounding buffer zone during the re-entry interval;
- persons entering the application site or surrounding buffer zone during the re-entry interval to perform scouting, crop advising, or monitoring tasks; and,
- persons installing, perforating (cutting, punching, slicing, poking), removing, repairing, or monitoring tarps. NOTE: see the *Tarp Perforation and Removal* section on this label for requirements about when tarps are allowed to be perforated and removed.
- persons outside the perimeter of the buffer zone who monitor fumigant air concentrations.

All fumigant handlers must wear appropriate personal protective equipment in accordance with the provincial/territorial pesticide regulatory agency where the pesticide application is to occur; including at minimum:

- long-sleeved shirt and long pants,
- chemical-resistant boots and socks,

- chemical-resistant gloves when handling liquid, and
- chemical-resistant apron when handling liquid

Eye and Lung Protection

- Wear protective eyewear (i.e. full-face shield or safety glasses) when handling liquid (DO NOT wear goggles).
- When a respirator is required, fumigant handlers must wear at a minimum either:
  - a full-face respirator with an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or
  - a full-face respirator with a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G).

Respirators must fit properly. Any obstruction to a proper fit should be removed (for example, beard, long sideburns).

IMPORTANT: An air-supplying respirator [such as, a respirator connected directly to a clean air source or a self-contained breathing apparatus (SCBA)] is not permitted for routine fumigant handler tasks. Such respirators are only permitted in emergencies such as a spill or leak or when corrective action is needed to reduce air levels to acceptable levels.

Respirator Availability

The supervising fumigant handler must confirm and document in the Fumigation Management Plan that at least one air rescue device (for example, SCBA) is on-site and is ready for use in case of an emergency

The supervising fumigant handler must confirm and document in the Fumigation Management Plan that an air-purifying respirator and appropriate cartridges of the type specified in the personal protective equipment section of this labelling are immediately available for each handler who will wear one.

At a minimum, two handlers must have the appropriate respirator and cartridges available.

Providing, Cleaning and Maintaining Personal Protective Equipment

The supervising fumigant handler must ensure that all handlers *in the application block and the surrounding buffer zone* are provided with and correctly wear the required personal protective equipment. The personal protective equipment must be cleaned and maintained.

Respiratory Protection and Stop Work Triggers
The following air monitoring procedures must be followed to determine whether respiratory protection is required, or if operations must cease, for any person performing a fumigant handling task as defined on this label.

- If at any time any handler experiences sensory irritation (tearing, burning of the eyes or nose) when not wearing a respirator then either:
  - an air-purifying respirator must be worn by all handlers who remain in the application block and surrounding buffer zone, and air monitoring samples must be collected at least every 2 hours in the breathing zone of a handler performing a representative handling task; or
  - operations must cease and handlers not wearing respiratory protection must leave the application block and surrounding buffer zone.
- Handlers can remove respirators or resume operations provided:
  - two consecutive breathing-zone samples taken at the handling site at least 15 minutes apart show that levels of chloropicrin have decreased to less than 0.15 ppm at the location where the irritation is first experienced; and
  - handlers do not experience sensory irritation.
  - IMPORTANT: See requirements in *Fumigant Air Monitoring* section.
- If at any time any handler experiences any sensory irritation when wearing a respirator or an air sample is greater than or equal to 1.5 ppm:
  - all handler activities must cease and handlers must be removed from the application block and surrounding buffer zone; and
  - the emergency plan detailed in the Fumigation Management Plan must be implemented.
- Handlers can resume work activities **with** appropriate respiratory protection provided all of the following conditions are met:
  - two consecutive breathing zone samples for chloropicrin taken at least 15 minutes apart must be less than 1.5 ppm, but greater than 0.15 ppm, at the location where irritation was first experienced;
  - handlers do not experience sensory irritation while wearing the air purifying respirator;
  - respirator cartridges have been changed; and
  - air monitoring samples must be collected at least every 2 hours in the breathing zone of a handler performing a representative handling task.
  - IMPORTANT: See requirements in the *Fumigant Air Monitoring* section.

- Handlers can resume work activities **without** respiratory protection provided all of the following conditions are met:
  - two consecutive breathing zone samples for chloropicrin taken at the handling site at least 15 minutes apart show levels of chloropicrin have decreased to less than 0.15 ppm at the location where the irritation was first experienced; and
  - handlers do not experience sensory irritation.
  - IMPORTANT: See requirements in the Fumigant Air Monitor*ing* section.

Fumigant Air Monitoring

- When using monitoring devices to monitor air concentration levels, a direct reading detection device, such as a Draeger or Sensidyne device must be used. The devices must have a sensitivity of at least 0.15 ppm for chloropicrin.
- During the collection of air samples an air purifying respirator must be worn by the handler taking air samples.
- The results of monitoring activities must be captured in the Fumigation Management Plan's post-application summary report.
- For all fumigant handling tasks (as defined on this label), at least two handlers must be present to monitor one another.

Exclusion of Non-Handlers from Application Block and Buffer Zone

The supervising fumigant handler and/or the owner/operator of the establishment where the fumigation is taking place must make sure that all persons who are not trained, not wearing personal protective equipment (PPE) or who are not performing one of the handling tasks defined on this label are:

- excluded from application block during the entry prohibition period, and
- excluded from the buffer zone during the re-entry interval.

5. Label amendments pertaining to application methods

Add to DIRECTIONS FOR USE:

For the antimicrobial product (current registration number 14588):

For remedial treatment of wooden poles/timbers:

1. Plug the pre-drilled holes immediately after applications;
2. Do not treat structures/beams indoors;

3. Do not drill an application hole through seasoning checks to apply product. If the hole intersects a check, plug the hole and drill another. If more than 2 treatment holes intersect an internal void or rot pocket, re-drill the holes farther up the pole into relatively solid wood.

DO NOT permit entry into the spill or leak area by any other person until the air concentration is measured to be less than 0.15 ppm of chloropicrin.

For all the soil fumigant products:

Tarp Perforation and/or Removal
IMPORTANT: Persons perforating, repairing, removing, and/or monitoring tarps are defined, within certain time limitations, as fumigant handlers (see definition of fumigant handlers on this label) and must be provided the personal protective equipment and other protections for handlers as required on this label.

Tarps must not be perforated until a minimum of 5 days (120 hours) have elapsed after the fumigant injection into the soil is complete (e.g., after injection of the fumigant product and tarps have been laid), unless a weather condition exists which necessitates the need for early perforation or removal. See the *Early Tarp Removal for Broadcast Applications* and *Early Tarp Perforation for Flood Prevention Activities* sections.

If tarps will be removed before planting, tarp removal must not begin until at least 2 hours after tarp perforation is complete.

If tarps will not be removed before planting, planting or transplanting must not begin until at least 48 hours after the tarp perforation is complete.

If tarps are left intact for a minimum of 14 days after fumigant injection into the soil is complete, planting or transplanting may take place while the tarps are being perforated.

Each tarp panel used for broadcast fumigation must be perforated.

Tarps used for fumigations may be perforated manually ONLY for the following situations:

- At the beginning of each row when a coulter blade (or other device which performs similarly) is used on a motorized vehicle such as an ATV.
- In fields that are 0.4 hectares (1 acre) or less.
- During flood prevention activities.

In all other instances tarps must be perforated (cut, punched, poked, or sliced) only by mechanical methods.

Tarp perforation for broadcast fumigations must be completed before noon.

For broadcast fumigations tarps must not be perforated if rainfall is expected within 12 hours.

Early Tarp Removal for Broadcast Applications

- Tarps may be removed before the required 5 days (120 hours) if adverse weather conditions have compromised the integrity of the tarp, provided that the compromised tarp poses a safety hazard. *Adverse weather* includes high wind, hail, or storms that blow tarps off the field and create a hazard, e.g., tarps blowing into power lines and onto roads. A *compromised tarp* is a tarp that due to an adverse weather condition is no longer performing its intended function and is creating a hazard.
- If tarps are removed before the required 5 days have elapsed due to adverse weather, the events must be documented in the post-application summary report section of the Fumigation Management Plan.

Early Tarp Perforation for Flood Prevention Activities

- Tarp perforation is allowed before the 5 days (120 hours) have elapsed.
- Tarps must be immediately retucked and packed after soil removal.

Entry Restricted Period

Entry (including early entry) by any person – other than a correctly trained and PPE-equipped handler, who is performing a handling task listed on this label – is PROHIBITED – from the start of the application until:

- 5 days (120 hours) after application is complete for untarped applications.
- 5 days (120 hours) after application is complete if tarps are not perforated and removed for at least 14 days following application, or
- 48 hours after tarps perforation is complete if they will not be removed for at least 14 days following application, or
- until tarp removal is completed if tarps are both perforated and removed less than 14 days after application.

NOTE: see the *Tarp Perforation and Removal* section on this label for requirements about when tarps are allowed to be perforated.

6. Label amendments pertaining to buffer zone requirements for the soil fumigant products

The DIRECTIONS FOR USE section of the soil fumigant product labels must include buffer zone tables. The buffer zone tables, based on the following tables, must only reference registered uses, application rates and application methods specific to each product label.

Table 1a. Chloropicrin buffer zone distances (metres) for bedded applications - untarped method and soil moisture greater than 70% (tensiometer) or greater than 75% (USDA Feel and Appearance Method – see the *Soil Moisture* section under Good Agricultural Practice requirements)

Broadcast Equivalent Application Rate (kg ai/ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
15	10	10	10	10	10	10	10	10	10
20	10	10	10	10	10	10	10	15	25
30	10	10	10	10	10	10	20	25	40
35	10	10	10	10	20	30	35	45	55
40	10	10	10	20	30	45	55	60	75
45	10	10	25	40	55	70	85	100	125
50	10	15	25	50	70	85	95	100	125
55	10	20	30	55	85	100	100	125	150
60	15	25	40	65	95	100	125	150	175
65	20	30	45	75	100	125	150	150	175
75	25	35	50	85	100	125	150	175	200
80	25	40	55	90	125	150	175	200	225
85	30	45	65	100	125	150	175	200	250
90	30	45	70	100	150	175	200	225	275
95	35	50	75	125	150	175	200	250	300
100	40	55	85	125	150	200	225	250	300
105	40	65	90	150	175	225	250	275	375
110	45	65	95	150	200	225	250	300	375
120	45	70	100	150	200	250	275	300	400
125	50	75	100	150	200	250	275	325	400
130	55	80	100	175	225	250	300	350	425
135	55	85	125	175	225	275	325	350	425
140	60	85	125	175	225	275	325	375	425
145	60	90	125	175	250	300	350	400	450
150	65	95	125	200	250	325	350	400	475
155	65	95	125	200	250	325	350	425	500
165	70	100	150	200	275	350	375	450	525
170	70	100	150	225	275	350	400	450	550
175	75	100	150	225	300	350	425	475	575
180	75	100	150	225	300	375	425	475	600
185	75	125	150	250	300	375	450	500	625

Broadcast Equivalent Application Rate (kg ai/ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
190	80	125	175	250	325	375	450	525	650
195	80	125	175	250	325	400	450	550	675

Table 1b. Chloropicrin buffer zone distances (metres) for bedded applications - untarped method and soil moisture between 50-69% (tensiometer) or between 50-75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
15	10	10	10	10	10	10	10	10	15
20	10	10	10	10	10	15	25	30	45
30	10	10	10	10	15	25	40	55	75
35	10	10	10	25	40	55	75	90	125
40	10	10	15	40	60	90	100	125	150
45	10	20	45	85	100	125	175	200	225
50	15	30	55	100	125	175	200	225	275
55	25	35	60	125	175	200	225	250	300
60	30	50	75	125	175	225	250	275	350
65	40	60	90	150	200	250	275	300	375
75	50	70	100	175	225	275	300	350	400
80	55	80	125	175	250	300	325	375	450
85	60	85	125	200	275	325	350	425	500
90	65	95	125	225	275	325	400	450	550
95	70	100	150	225	300	350	425	475	575
100	75	125	175	250	325	400	450	500	625
105	85	125	175	275	350	425	500	575	750
110	90	125	200	300	375	450	525	600	775
120	90	125	200	300	400	475	550	600	775
125	100	150	200	325	425	500	575	650	800
130	100	150	225	350	425	525	600	675	825
135	125	175	225	350	450	550	625	725	850
140	125	175	250	350	475	575	650	750	875
145	125	175	250	350	500	600	675	775	875
150	125	175	250	375	500	625	700	825	925
155	125	200	275	400	525	675	725	850	975
165	125	200	275	425	550	675	750	875	1025
170	150	200	300	425	575	700	800	900	1075
175	150	225	300	450	575	725	850	925	1150
180	150	225	300	475	600	725	850	975	1200
185	150	225	325	475	625	750	875	1000	1225
190	150	225	325	500	650	750	900	1050	1275
195	150	250	325	500	675	775	925	1075	1325

Table 2a. Chloropicrin buffer zone distances (metres) for bedded applications - tarped method and soil moister greater than 70% (tensiometer) or greater than 75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
100	10	10	10	10	10	10	10	10	10
105	10	10	10	10	10	10	10	10	10
110	10	10	10	10	10	10	10	10	10
120	10	10	10	10	10	10	10	10	10
125	10	10	10	10	10	10	10	10	10
130	10	10	10	10	10	10	10	10	10
135	10	10	10	10	10	10	10	10	10
140	10	10	10	10	10	10	10	10	10
145	10	10	10	10	10	10	10	10	15
150	10	10	10	10	10	10	10	10	15
155	10	10	10	10	10	10	10	10	15
165	10	10	10	10	10	10	10	10	20
170	10	10	10	10	10	10	15	15	25
175	10	10	10	10	10	15	15	20	30
180	10	10	10	10	10	15	20	25	35
185	10	10	10	10	10	15	25	30	40
190	10	10	10	10	10	20	25	35	45
195	10	10	10	10	10	20	30	40	50
200	10	10	10	10	15	25	35	45	55
205	10	10	10	10	20	30	40	50	60
215	10	10	10	15	25	35	45	55	65
220	10	10	10	15	30	35	50	60	75
225	10	10	10	20	35	40	50	60	80
230	10	10	10	20	40	45	55	65	85
235	10	10	10	25	45	50	60	70	90
240	10	10	10	25	45	55	65	75	90
245	10	10	10	30	50	55	65	75	95
250	10	10	10	35	50	60	70	80	95
260	10	10	10	35	55	60	75	85	95
265	10	10	15	40	55	65	75	85	100
270	10	10	15	45	60	65	80	90	100
275	10	10	15	45	60	70	80	95	100
280	10	10	15	45	65	75	85	100	100
285	10	10	20	50	65	75	90	100	125
290	10	10	20	50	70	80	90	100	125
295	10	10	25	50	70	80	95	100	125
305	10	10	25	50	75	85	100	125	125
310	10	10	30	55	80	85	100	125	150
315	10	10	30	55	80	90	100	125	150

Table 2b. Chloropicrin buffer zone distances (metres) for bedded applications - tarped method and soil moisture between 50-69% (tensiometer) or 50-75% between (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
100	25	25	25	25	25	25	25	25	25
105	25	25	25	25	25	25	25	25	25
110	25	25	25	25	25	25	25	25	25
120	25	25	25	25	25	25	25	25	25
125	25	25	25	25	25	25	25	25	25
130	25	25	25	25	25	25	25	25	30
135	25	25	25	25	25	25	25	25	35
140	25	25	25	25	25	25	25	25	35
145	25	25	25	25	25	25	25	25	40
150	25	25	25	25	25	25	25	25	40
155	25	25	25	25	25	25	25	25	45
165	25	25	25	25	25	30	35	35	60
170	25	25	25	25	25	35	40	50	75
175	25	25	25	25	25	40	50	65	90
180	25	25	25	25	30	45	60	80	100
185	25	25	25	25	30	50	70	95	125
190	25	25	25	25	30	55	80	100	125
195	25	25	25	25	30	60	90	125	150
200	25	25	25	30	45	75	100	125	175
205	25	25	25	35	60	85	125	150	175
215	25	25	25	45	75	100	125	150	200
220	25	25	25	50	85	100	150	175	225
225	25	25	25	60	100	125	150	175	225
230	25	25	25	65	125	150	175	200	250
235	25	25	25	75	125	150	175	200	275
240	25	25	25	80	125	150	200	225	275
245	25	25	30	90	150	175	200	225	275
250	25	25	35	100	150	175	200	250	275
260	25	25	35	100	150	175	225	250	300
265	25	25	40	125	175	200	225	250	300
270	25	25	40	125	175	200	225	275	300
275	25	25	45	125	175	200	250	275	300
280	25	30	50	150	200	225	250	300	325
285	25	30	60	150	200	225	275	300	350
290	25	30	65	150	200	225	275	325	375
295	25	35	70	150	225	250	275	325	400
305	25	35	80	150	225	250	300	350	400
310	25	35	85	150	225	250	300	350	425
315	25	35	90	175	250	275	325	350	450

Table 3a. Chloropicrin buffer zone distances (metres) for broadcast applications – untarped method and soil moisture greater than 70% (tensiometer) or greater than75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
35	10	10	10	10	10	10	10	10	10
40	10	10	10	10	10	10	15	15	25
45	10	10	10	10	10	15	25	35	50
50	10	10	10	10	20	30	40	50	70
55	10	10	10	10	25	45	55	70	90
60	10	10	10	20	40	60	75	85	100
65	10	10	10	35	55	75	90	100	125
75	10	10	15	45	65	85	100	125	150
80	10	10	20	55	80	100	125	150	175
85	10	15	30	65	95	125	150	150	200
90	10	15	40	80	100	125	150	175	225
95	10	20	50	90	125	150	175	200	250
100	15	25	55	95	125	150	200	225	275
105	15	35	65	100	150	175	200	225	300
110	20	40	70	100	150	175	225	250	325
120	25	50	75	100	150	200	225	275	350
125	25	55	80	125	175	200	250	275	375
130	30	55	85	125	175	225	275	300	375
135	30	60	90	150	200	250	275	325	400
140	30	60	95	150	200	250	300	325	425
145	35	65	100	150	225	275	300	350	425
150	35	75	100	175	225	275	325	350	450
155	40	80	125	175	250	300	325	350	475
165	40	80	125	175	250	300	350	375	475
170	40	85	125	200	250	325	350	375	500
175	40	85	125	200	275	325	375	400	525
180	40	90	150	200	275	350	375	400	525
185	45	95	150	225	275	350	400	425	550
190	45	100	150	225	300	350	400	450	550
195	50	100	150	225	300	375	425	475	575

Table 3b. Chloropicrin buffer zone distances (metres) for broadcast applications – untarped method and soil moisture between 50-69% (tensiometer) or between 50-75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
35	25	25	25	25	25	25	25	25	25
40	25	25	25	25	25	30	40	45	70
45	25	25	25	25	25	45	75	100	150
50	25	25	25	25	55	85	125	150	225
55	25	25	25	25	80	125	175	200	275
60	25	25	25	60	125	175	225	250	325
65	25	25	25	100	150	225	275	300	400
75	25	25	40	125	200	250	325	375	450
80	25	30	60	175	250	300	350	425	500
85	25	40	90	200	275	350	425	475	575
90	25	45	125	225	325	400	375	525	650
95	25	55	150	275	350	450	525	600	725
100	40	80	175	275	375	475	575	650	800
105	50	100	200	300	425	525	600	700	900
110	65	125	200	300	450	550	650	750	975
120	75	150	225	325	475	600	700	800	1075
125	80	150	250	350	500	625	750	850	1125
130	85	175	250	375	550	675	800	900	1150
135	90	175	275	425	575	725	850	950	1200
140	95	200	275	450	625	775	875	1000	1250
145	100	200	300	475	650	800	925	1050	1275
150	100	225	325	500	675	825	950	1075	1325
155	125	225	350	525	725	875	975	1075	1400
165	125	250	375	550	750	900	1025	1125	1450
170	125	250	400	575	775	950	1050	1150	1500
175	125	250	400	600	800	1000	1100	1200	1550
180	125	275	425	625	825	1025	1125	1225	1600
185	125	275	450	650	850	1050	1175	1300	1625
190	150	300	450	675	875	1075	1225	1350	1650
195	150	300	450	700	925	1100	1250	1425	1700

Table 4a. Chloropicrin buffer zone distances (metres) for broadcast applications – tarped method and soil moisture greater than 70% (tensiometer) or greater than75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
80	10	10	10	10	10	10	10	10	10
90	10	10	10	10	10	10	10	10	15
100	10	10	10	10	10	10	10	15	20
105	10	10	10	10	10	10	15	20	25
110	10	10	10	10	10	10	15	20	30
120	10	10	10	10	10	10	20	25	35
125	10	10	10	10	10	15	25	30	40
130	10	10	10	15	15	20	30	35	50
135	10	10	10	15	20	25	35	45	55
140	10	10	10	20	25	30	40	50	60
145	10	10	10	20	25	35	45	55	70
150	10	10	10	25	30	40	50	60	75
155	10	10	10	25	35	45	55	65	80
165	10	10	10	30	40	50	60	70	85
170	10	10	15	30	45	55	65	75	95
175	10	10	15	35	50	60	70	80	100
180	10	10	20	35	50	65	75	85	100
185	10	10	20	40	55	65	80	90	100
190	10	10	25	45	60	70	85	95	125
195	10	10	25	45	65	75	90	100	125
200	10	15	30	50	70	85	95	100	125
205	10	15	30	55	75	90	100	125	150
215	10	20	35	55	75	95	100	125	150
220	10	20	40	60	80	100	125	125	150
225	15	25	40	65	85	100	125	125	150
230	15	25	45	65	85	125	125	150	175
235	15	30	50	70	90	125	125	150	175
240	15	30	50	75	95	125	150	150	175
245	15	30	50	75	100	125	150	150	175
250	20	35	55	80	100	125	150	150	200
260	20	35	55	80	100	125	150	175	200
265	20	40	60	85	100	150	150	175	200
270	20	40	60	85	125	150	150	175	200
275	25	45	60	90	125	150	175	175	200
280	25	45	60	90	125	150	175	175	225
285	25	45	65	95	125	150	175	200	225
290	25	45	65	95	125	150	175	200	225
295	25	45	65	100	125	150	175	200	250
305	25	50	65	100	150	150	175	200	250
310	25	50	70	100	150	175	175	200	250
315	25	50	70	100	150	175	200	200	275

Table 4b. Chloropicrin buffer zone distances (metres) for broadcast applications – tarped method and soil moisture between 50-69% (tensiometer) or between 50-75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
80	25	25	25	25	25	25	25	25	25
90	25	25	25	25	25	25	30	35	40
100	25	25	25	25	25	25	35	45	55
105	25	25	25	25	25	30	40	55	70
110	25	25	25	25	25	30	50	65	90
120	25	25	25	25	25	30	55	80	100
125	25	25	25	30	35	45	70	95	125
130	25	25	25	40	45	60	85	100	150
135	25	25	25	45	60	75	100	125	175
140	25	25	25	55	70	90	125	150	175
145	25	25	25	60	80	100	125	175	200
150	25	25	25	70	95	125	150	175	225
155	25	25	25	80	100	125	175	200	250
165	25	25	30	85	125	150	175	200	250
170	25	25	40	95	125	175	200	225	275
175	25	25	45	100	150	175	200	250	300
180	25	30	55	100	150	200	225	250	325
185	25	30	60	125	175	200	225	275	325
190	25	30	70	125	175	225	250	275	350
195	25	35	80	125	200	225	275	300	375
200	25	40	85	150	200	250	275	325	400
205	30	50	95	150	225	275	300	350	425
215	35	55	100	175	225	275	325	375	450
220	35	60	125	175	250	300	350	375	475
225	40	70	125	200	250	325	375	400	475
230	40	75	125	200	250	350	375	425	500
235	45	85	150	200	275	350	400	450	525
240	50	90	150	225	275	375	425	450	550
245	50	95	150	225	300	375	425	475	550
250	55	100	150	225	300	400	450	475	575
260	60	100	175	250	325	400	450	500	575
265	60	125	175	250	325	425	475	525	600
270	65	125	175	250	350	425	475	525	600
275	70	125	175	275	350	450	500	550	625
280	70	125	175	275	375	450	500	550	650
285	70	125	200	275	375	475	525	575	675
290	75	150	200	300	400	475	525	575	700
295	75	150	200	300	400	475	525	600	725
305	75	150	200	300	425	475	550	600	750
310	80	150	200	325	425	500	550	625	775
315	80	150	200	325	450	500	575	625	800

Table 5a. Chloropicrin buffer zone distances (metres) for broadcast deep applications – untarped method and soil moisture greater than 70% (tensiometer) or greater than75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
35	10	10	10	10	10	10	10	10	10
45	10	10	10	10	15	15	20	20	25
55	10	10	10	15	20	25	30	35	45
65	10	10	10	20	35	45	55	60	80
80	10	10	10	25	45	65	80	90	125
90	10	10	15	45	65	85	100	125	150
100	10	15	25	60	85	100	125	150	175
110	10	15	35	75	100	125	150	175	200
120	10	20	45	85	125	150	175	200	225
125	10	25	50	90	125	150	175	200	250
130	15	30	55	100	125	150	175	225	250
135	15	35	60	100	150	175	200	225	275
140	20	40	65	100	150	175	200	250	300
145	20	45	70	125	150	200	225	250	300
150	25	50	75	125	175	200	225	275	325
155	25	55	80	125	175	200	250	275	325
165	30	55	85	125	175	225	250	300	350
170	30	60	90	150	200	225	275	300	375
175	30	60	95	150	200	250	275	325	400
180	30	65	95	150	200	250	300	350	425
185	35	70	100	175	225	275	300	350	425
190	35	70	100	175	225	275	325	375	450
195	35	75	100	175	225	275	325	375	475
200	40	80	125	175	250	300	350	400	475
205	40	80	125	200	250	300	350	425	500
215	40	85	125	200	275	325	375	425	500
220	45	90	125	200	275	325	375	450	525
225	45	95	125	225	275	325	400	450	525
230	45	95	150	225	300	350	400	475	550
235	50	100	150	250	300	350	425	475	550
240	50	100	150	250	300	375	425	500	550
245	55	100	150	250	325	375	450	500	575
250	60	125	150	250	325	375	450	525	575
260	60	125	175	275	325	400	450	525	575
265	65	125	175	275	325	400	475	550	575
270	65	125	175	275	350	400	475	550	600
275	70	125	175	275	350	425	500	575	600
280	70	125	175	275	350	425	500	575	625
285	75	125	175	300	375	425	500	575	625
290	75	125	200	300	375	450	525	600	650
295	80	150	200	300	375	450	525	600	675
305	80	150	200	300	400	450	525	600	675
310	85	150	200	300	400	475	550	625	700
315	85	150	200	300	400	475	550	625	725

Table 5b. Chloropicrin buffer zone distances (metres) for broadcast deep applications – untarped method and soil moisture between 50-69% (tensiometer) or between 50-75% (USDA Feel and Appearance Method)

Broadcast Equivalent Application Rate (kg a.i./ha)	Application Block Size (Hectares)								
	1	2	4	8	10	15	20	25	30
35	25	25	25	25	25	25	25	25	25
45	25	25	25	30	40	50	60	65	75
55	25	25	25	40	60	80	95	100	125
65	25	25	25	60	100	150	175	175	250
80	25	25	25	80	125	200	225	275	350
90	25	30	50	125	200	250	300	350	425
100	25	40	80	175	250	325	375	425	525
110	25	45	100	225	300	375	425	500	600
120	25	55	125	250	350	425	500	575	700
125	35	70	150	275	375	450	525	600	725
130	40	85	175	300	400	475	575	650	775
135	50	100	175	325	425	500	600	675	825
140	60	125	200	325	450	550	625	725	875
145	65	125	200	350	475	575	675	750	925
150	75	150	225	375	500	600	700	800	950
155	80	150	250	400	525	625	725	825	1000
165	85	175	250	400	550	675	775	875	1075
170	90	175	275	425	575	700	800	925	1125
175	95	175	275	450	600	725	850	975	1175
180	95	200	300	475	625	750	875	1025	1250
185	100	200	300	500	650	800	925	1075	1300
190	100	225	325	500	675	825	975	1100	1375
195	100	225	325	525	700	850	1000	1150	1425
200	125	225	350	550	725	875	1050	1200	1450
205	125	250	350	575	775	925	1075	1250	1500
215	125	250	375	600	800	950	1125	1275	1525
220	125	275	400	625	825	975	1150	1325	1550
225	125	275	400	675	850	1000	1175	1350	1575
230	150	300	425	700	875	1050	1225	1400	1625
235	150	300	450	725	925	1075	1250	1450	1650
240	150	325	450	725	925	1100	1300	1475	1675
245	175	325	475	750	950	1125	1325	1525	1675
250	175	350	475	775	975	1150	1350	1550	1725
260	175	350	500	800	1000	1175	1375	1600	1725
265	200	350	500	800	1000	1200	1425	1625	1750
270	200	375	525	825	1025	1225	1450	1675	1775
275	200	375	550	850	1050	1250	1475	1700	1800
280	225	400	550	850	1075	1275	1500	1725	1850
285	225	400	550	875	1100	1300	1525	1750	1900
290	225	400	575	875	1125	1325	1550	1775	1950
295	225	425	575	875	1150	1350	1575	1800	2000
305	250	425	600	900	1175	1375	1600	1825	2050
310	250	425	600	900	1200	1400	1625	1850	2100
315	250	450	625	925	1225	1425	1650	1875	2150

Add to DIRECTIONS FOR USE:

Buffer Zones

A "buffer zone" must be established for every fumigant application. The following describes the general buffer zone requirements:

- "Buffer zone" is an area established around the perimeter of each application block where a soil fumigant is applied. The buffer zone must extend from the edge of the application block perimeter equally in all directions.
- All non-handlers including field workers, nearby residents, pedestrians, and other bystanders, must be excluded from the buffer zone during the re-entry interval except for certain persons in transit (see the *Exemptions for Transit Through Buffer Zones* section).
- The "re-entry interval" starts at the moment when any fumigant is delivered/dispensed to the soil within the application block and lasts for a minimum of 48 hours after the fumigant has stopped being delivered/dispensed to the soil.
- An "application block" is a field or a portion of a field treated with a fumigant in any 24-hour period (see Figures 1 and 2 for further explanations). See exception provided in the *Buffer Zone Proximity* section.

Buffer Zone Proximity

Before the application begins, the supervising fumigant handler must determine whether the application block or its resulting buffer will overlap with a buffer that is already in effect.

To reduce the potential for off-site movement from multiple fumigated fields, buffer zones from multiple chloropicrin application blocks may not overlap UNLESS:

- A minimum of 12 hours have elapsed from the time the earlier application(s) for which a buffer is in place end(s) until the latter application begins, and
- Emergency preparedness and response measures specified in the Fumigation Management Plan have been implemented if there are any homes, businesses, or property not within the control of the owner/operator within 90 metres of each buffer zone.

Authorized Entry to Buffer Zones
Only authorized handlers may be in the buffer zone during the re-entry interval. All non-handlers including field workers, nearby residents, pedestrians, and other bystanders, must be excluded from the buffer zone during the re-entry interval except for certain persons in transit (see the *Exemptions for Transit Through Buffer Zones* section).

Exemptions for Transit Through Buffer Zones
Vehicular and bicycle traffic on public and private roadways through the buffer zone is permitted. "Roadway" means that portion of a street or highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk or shoulder even if such sidewalk or shoulder is used by persons riding bicycles. In the event a highway includes two or more separated roadways, the term "roadway" shall refer to any such roadway separately.

Bus stops or other locations where persons wait for public transit are not permitted within the buffer zone. See the *Posting Requirements* section for additional requirements that may apply.

Structures Under the Control of Owner/Operator of the Application Block
Buffer zones may not include buildings used for storage such as sheds, barns, garages, etc., UNLESS,
1. The storage buildings are not occupied during the re-entry interval, and
2. The storage buildings do not share a common wall with an occupied structure.

- See the *Posting Requirements* section for additional requirements that may apply.

Areas Not Under the Control of Owner/Operator of the Application Block
Buffer zones may not include residential areas (including employee housing, private property, commercial and industrial buildings, and other areas that people may occupy or outdoor residential areas, such as lawns, gardens, or play areas), UNLESS,
1. The occupants provide written agreement to the supervising fumigant handler and/or the owner/operator that they will voluntarily vacate the buffer zone during the entire re-entry interval, and
2. Re-entry by occupants and other non-handlers must not occur until,
    - The re-entry interval has ended, and
    - Sensory irritation is not experienced.

Buffer zones may not include agricultural areas owned/operated by persons other than the owner/operator of the application block, UNLESS,

1. The owner/operator of the application block can ensure that the buffer zone will not overlap with a buffer zone from any adjacent property owners, except as provided for above, and
2. The owner/operator of the adjacent areas (such as areas that are not under the control of the owner/operator of the application block) provides written agreement to the supervising fumigant handler that they, their employees, and other persons will stay out of the buffer zone during the entire re-entry interval.

Buffer zones must not include roads and rights of way UNLESS,

1. The area is not occupied during the re-entry interval, and
2. Entry by non-handlers is prohibited during the re-entry interval.

For all other publicly owned and/or operated areas such as parks, sidewalks, walking paths, playgrounds and athletic fields, buffer zones must not include these areas UNLESS,

1. The area is not occupied during the re-entry interval,
2. Entry by non-handlers is prohibited during the re-entry interval, and
3. Written permission to include the public area in the buffer zone is granted to the supervising fumigant handler and/or the owner/operator by the appropriate provincial/territorial and/or local authorities responsible for management and operation of the area.

- See the *Posting Requirements* section for additional requirements that may apply.
- It is the responsibility of the supervising fumigant handler to record all communications pertaining to areas not under control of the owner/operator in the Fumigation Management Plan.

Difficult to Evacuate Sites

Difficult-to-evacuate sites include schools (preschool to grade 12), provincial licensed daycare centers, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons.

- No fumigant application with a buffer zone greater than 90 metres is permitted within 400 metres of the sites listed above unless the site is not occupied during the application and the 36-hour period following the start of application.
- No fumigant application with a buffer zone of 90 metres or less is permitted within 200 metres of the sites listed above unless the site is not occupied during the application and the 36-hour period following the start of application

Buffer Zone Distances

Buffer zone distances must be calculated using the application rate and the size of the application block.

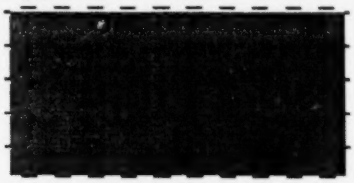

Figure 1. Broadcast Application

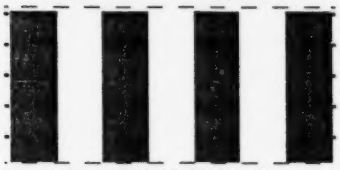

Figure 2. Bedded Application

In Figures 1 and 2, the dashed line represents the perimeter of the field, the shaded area is the portion of the field that is treated, and the un-shaded area is the area of the field that is untreated. Assuming both fields are one hectare, and only 50% of field in Figure 2 is fumigated, the rate per treated hectare is 300 kg chloropicrin per hecatre for both Figure 1 and 2. The broadcast rate for Figure 1 is 300 kg of chloropicrin per hectare but the effective broadcast equivalent rate for Figure 2 is 150 kg of chloropicrin per hectare. The buffer zone distances must be based on the broadcast or effective broadcast equivalent rates.

Note to registrant: Labels may express rates as kg per treated hectare under the application instructions but they must identify buffer zone distances based on the broadcast or effective broadcast equivalent rates.

Buffer zone distances must be based on "look-up tables" on product labels.

Ten (10) metres is the minimum buffer distance regardless of site-specific application parameters.

If the buffer zone distance, after applying all applicable buffer zone credits, is greater than 0.8 km (800 metres) then the application is prohibited.

For selective replant fumigation in an orchard using hand held application methods (e.g., deep injection auger probes), the minimum buffer zone will be 10 metres measured from the centre of each injection site (i.e., tree hole).

For all other soil applications, the buffer zone look-up tables must be used to determine the minimum buffer zone distances. Round-up to the nearest rate and block size, where applicable.

Buffer Zone Credits

The buffer zone distances (from the look-up tables) for chloropicrin applications may be reduced by the percentages listed below. Credits may be added, but credits cannot exceed 80%. IMPORTANT: The buffer zone distance is a minimum of 10 metres and maximum of 800 metres with or without buffer zone credits.

- 30% reduction in buffer zone distance, if using Canslit Heatstrip Silver and Canslit Metalized. The tarp brand name, manufacturer, lot number, batch number, part number, and thickness must be recorded in the Fumigation Management Plan.
- 60% reduction in buffer zone distance, if using Olefinas Embossed VIF, Klerks VIF, Pliant Blockade, Bromostop® (1.38 mil), IPM Clear VIF (1.38 mil), Eval/Mitsui (1.38 mil) tarps, Hytiblock 7 Black (0.00125"), XL Black Blockade (0.00125"), and Hytibar (1.5 mil). The tarp brand name, manufacturer, lot number, batch number, part number, and thickness must be recorded in the Fumigation Management Plan.
- 40% reduction in the buffer zone distance, if the Symmetry™ application system is used with either Canslit Heatstrip Silver or Canslit Metalized tarps AND the application rate is less than 112 kg of active ingredient per hectare.
- 70% reduction in buffer zone distance, if the Symmetry™ application system is used with Olefinas Embossed VIF, Klerks VIF, Pliant Blockade, Bromostop® (1.38 mil), IPM Clear VIF (1.38 mil), Eval/Mitsui (1.38 mil) tarps, Hytiblock 7 Black (0.00125"), XL Black Blockade (0.00125"), and Hytibar (1.5 mil) tarps AND the application rate is less than 112 kg of active ingredient per hectare.
- 15% reduction in buffer zone distance if potassium thiosulfate (KTS) is applied with 0.6 to 1.3 cm of water over a tarp.
- 15% reduction in buffer zone distance, if 0.6 to 1.3 cm of water is applied over a tarp.

- 10% reduction in buffer zone distance, if the organic content of soil in the application block is greater than 1% to 2%; a 20% reduction in buffer zone distance, if the organic content of the soil in the application block is greater than 2% to 3%; and a 30% reduction in the buffer zone distance, if the organic content of the soil in the application block is greater than 3%. No credit will be given for soils with less than 1% organic matter. Record the measurements taken to verify the organic content in the Fumigation Management Plan.
- 10% reduction in buffer zone distance, if the soil temperature is measured to be 10°C or less at a soil depth of 8 cm.
- 10% reduction in buffer zone distance, if the clay content of the soil in the application block is greater than 27%. Record the measurements taken to verify the clay content in the Fumigation Management Plan.

Example of buffer calculation if a credit is applicable
For example, if the buffer zone is 15 metres, and the application qualifies for a buffer zone reduction credit since the soil organic content is greater than 1% to 2%, the buffer zone can be reduced by 10% (i.e., reduced by 1.5 metres based on the following calculation: 15 metres – [15 metres × 10%] = 13.5 metres).

7. Label amendments pertaining to Good Agricultural Practice requirements for the soil fumigant products

Add to DIRECTIONS FOR USE:

The following Good Agricultural Practices must be followed during all fumigant applications. All measurements and other documentation planned to ensure that the mandatory Good Agricultural Practices are achieved must be recorded in the Fumigation Management Plan.

Weather Conditions

- Prior to fumigation the weather forecast for the day of the application and the 48-hour period following the fumigant application must be checked to determine if unfavourable weather conditions exist (see *Identifying Unfavourable Weather Conditions* section) or are predicted and whether fumigation should proceed.
- Wind speed at the application site must be a minimum of 3 km/hr at the start of the application or forecast to reach at least 8 km/hr during the application.

- Do not apply if a shallow, compressed (low-level) temperature inversion is forecast to persist for more than 18 consecutive hours for the 48 hours period after the start of application, or if there is an air-stagnation advisory in effect for the area in which the fumigation is planned.

Identifying Unfavourable Weather Conditions

- Unfavourable weather conditions block upward movement of air, which results in trapping fumigant vapours near the ground. The resulting air mass can move off-site in unpredictable directions and cause injury to humans, animals or property. These conditions typically exist prior to sunset and continue past sunrise and persist as late as noontime. Unfavourable conditions are common on nights with limited cloud cover and light to no wind and their presence can be indicated by ground fog or smog and can also be identified by smoke from a ground source that flattens out below a ceiling layer and moves laterally in a concentrated cloud.

Soil Preparation

- Soil shall be properly prepared and at the surface generally be free of clods that are golf ball size or larger. The area to be fumigated shall be tilled to a depth of 13 to 20 cm.
- Field trash must be properly managed. Residue from a previous crop must be worked into the soil to allow for decomposition prior to fumigation. Little or no crop residue shall be present on the soil surface. Crop residue that is present must not interfere with the soil seal. Removing the crop residue prior to fumigation is important to limit the natural "chimneys" that will occur in the soil when crop residue is present. These "chimneys" allow the soil fumigants to move through the soil quickly and escape into the atmosphere. This may create potentially harmful conditions for workers and bystanders and will limit the efficacy of the fumigant. However, crop residue on the field serves to prevent soil erosion from both wind and water and is an important consideration. To accommodate erosion control, fumigant efficacy, and human health protection, clear fields of crop residue as close to the timing of the fumigation as possible to limit the length of time that the soil would be exposed to potentially erosive weather conditions.

Soil Temperature

- The maximum soil temperature at the depth of injection shall not exceed 32°C at the beginning of the application. If air temperatures have been above 37°C for more than three hours in any of the three days prior to application, then soil temperature shall be measured and recorded in the Fumigation Management Plan.

Soil Moisture

- The soil must be moist 20 cm below the surface. Soil moisture must be determined by one of the following methods:
  - The United States Department of Agriculture (USDA) Feel and Appearance Method for testing. Surface soil generally dries rapidly and must not be considered in this determination. Please refer to the following document for instructions: http://nmp.tamu.edu/content/tools/estimatingsoilmoisture.pdf
  - An instrument, such as a tensiometer.
- If there is insufficient moisture 20 cm below the surface, the soil moisture must be adjusted. If irrigation is not available and there is adequate soil moisture below 20 cm, soil moisture can be adjusted by discing or plowing before fumigant injection. To conserve existing soil moisture, pretreatment irrigation or pretreatment tillage should be done as close to the time of application as possible.
- Measure soil moisture at a depth of 20 cm at either end of the field, no more than 48 hours prior to application.

For injection applications:

In addition to the Good Agricultural Practices required for all chloropicrin soil fumigation applications, the following Good Agricultural Practices apply for chloropicrin injection applications:

Tarps (when tarps are used)
Tarps must be installed immediately after the fumigant is applied to the soil.

Soil Preparation
Trash pulled by the shanks to the ends of the field must be covered with tarp, or soil, depending on the application method before making the turn for the next pass.

Application Depth

- *For Tarped-Broadcast and Tarped-Bedded Applications:* The injection point shall be a minimum of 20 cm from the nearest final soil/air interface.
- *For Untarped-Bedded Applications*: The injection point shall be a minimum of 30 cm from the nearest final soil/air interface.
- *For Untarped-Broadcast Applications*: The injection point shall be a minimum of 25 cm from the nearest final soil/air interface.

Soil Sealing

- *For Broadcast Untarped Applications:* Use a disc or similar equipment to uniformly mix the soil to at least a depth of 8-10 cm to eliminate the chisel or plow traces. Following elimination of the chisel trace, the soil surface must be compacted with a cultipacker, ring roller, and roller in combination with tillage equipment.
- *For Bedded Applications*: Preformed beds shall be sealed by disruption of the chisel trace using press sealers, bed shapers, cultipackers, or by re-shaping (relisting, lifting and replacing, etc.) the beds immediately following injection. Beds formed at the time of application shall be sealed by disrupting the chisel trace using press sealers, or bed shapers.
- *Soil Sealing for Tarped Applications*: The use of a tarp does not eliminate the need to minimize chisel traces prior to application of the tarp, such as by using a nobel plow or other injection shank that disrupts the chisel traces.

Prevention of End Row Spillage

- Do not apply or allow fumigant to drain onto the soil surface. For each injection line either have a check valve located as close as possible to the final injection point, or drain/purge the line of any remaining fumigant prior to lifting injection shanks from the ground.
- Do not lift injection shanks from the soil until the shut-off valve has been closed and the fumigant has been depressurized (passively drained) or purged (actively forced out via air compressor) from the system.

Calibration, Set-up, Repair, and Maintenance for Application Equipment

- Application equipment should be set-up, calibrated, maintained and repaired according to equipment manufacturer instructions and the provincial or territorial regulations in the jurisdiction of use.

For tree replant applications:

This application method is used when chloropicrin is applied to individual tree sites in an existing orchard where shank application is not possible.

In addition to the Good Agricultural Practices required for all chloropicrin soil fumigation applications, the following Good Agricultural Practices apply for chloropicrin tree replant applications:

Site Preparation

- At each individual tree-site, the tree stump and primary root system must be removed with a back-hoe or other similar equipment, for example an auger.
- The hole must be backfilled with soil before application.

Application Depth

- The fumigant must be injected at least 45 cm into the soil.

System Flush

- Before removing the application wand from the soil the wand must be cleared using nitrogen or compressed air.

Soil Sealing

After the wand is cleared and removed from the soil, the injection hole must be either covered with soil and tarp or the soil must be compacted over the injection hole.

8. Additional label amendments for the soil fumigant products

Add to DIRECTIONS FOR USE:

Posting Requirements

The applicator must verbally warn workers and placard or post bilingual warning signs on all entrances to the fumigated area and/or the application block (field or portion of a field treated with a fumigant in any 24-hour period). These signs must be posted at eye level and must be visible from all visible points of entry to the treated area. They must remain posted during application and throughout the restricted re-entry interval.

All warning signs must conform to the following requirements:

- The printed side of the sign must face away from the treated area toward areas from which people can approach.

- Signs must be clearly legible during entire posting period. The sign shall be at least 35 cm by 25 cm in size and the letters shall be at least 7 cm in height unless a smaller-sized sign is necessary because the treated area is too small to accommodate a sign of this size.
- Signs must be posted before the application begins and remain posted until the re-entry interval has expired.
- Signs must be removed within 3 days after the end of the re-entry interval.
- Registrants must provide generic warning signs which meet the criteria above at points of sale for applicators to use.
- Only a supervising fumigant handler (or someone under his/her supervision) may remove warning signs.

Warning signs for the **buffer zone** must:

- Be placed at all usual points of entry and along likely routes of approach from areas where people not under the land operator's control may approach the buffer zone.
    - Some examples of points of entry include, but are not limited to, roadways, sidewalks, paths, and bike trails.
    - Some examples of likely routes of approach are the area between a buffer zone and a roadway, or the area between a buffer zone and a housing development.
    - Posting of warning signs for the fumigation **buffer zone** is required, **unless** there is a physical barrier that prevents bystander access into the buffer zone.
    - Exception: If multiple contiguous blocks are fumigated within a 14-day period, the entire periphery of the contiguous blocks' buffer zones may be posted. The signs must remain posted until the last re-entry interval expires and signs may remain posted until 3 days after the re-entry interval for the last block has expired.

The warning signs for the **buffer zone** must bear the following:

- Do not walk sign
- "DO NOT ENTER"
- "Chloropicrin [name of product] Fumigant BUFFER ZONE"
- Contact information for the supervising fumigant handler in charge of the fumigation

The warning signs for the **treated area** must:

- Remain posted for no less than the duration of the re-entry interval after treatment.
- Be removed within 3 days after the end of the re-entry interval

Emergency Preparedness and Response
If any of the following conditions apply the supervising fumigant handler must either follow the directions for **"Fumigant Site Monitoring"** or follow the directions for **"Response Information for Neighbours"**.

- Buffer zone is greater than **10 metres** and less than or equal to **30 metres**, and there are residences and businesses within **15 metres** from the edge of the buffer zone; or,
- Buffer zone is greater than **30 metres** and less than or equal to **60 metres**, and there are residences and businesses within **30 metres** from the edge of the buffer zone; or,
- Buffer zone is greater than **60 metres** and less than or equal to **90 metres**, and there are residences and businesses within **60 metres** from the edge of the buffer zone; or,
- Buffer zone is greater than **90 metres** or the **buffer zones overlap**, and there are residences and businesses within **90 metres from the** edge of the buffer zone.

If the buffer zone is **10 metres** then the Emergency Preparedness and Response requirements are not applicable.

Fumigation Site Monitoring
From the beginning of the fumigant application until the re-entry interval expires, a supervising fumigant handler or someone under his/her supervision must monitor the air concentration levels of the fumigant in the area between the buffer zone perimeter and the areas (such as residences or businesses) that trigger this requirement.

Monitoring the air concentration levels must begin in the evening on the day of application and continue until the re-entry interval expires with a minimum of at least 8 samples during the re-entry interval, including these periods:

- Once, 1 hour before sunset,
- Once, during the night,
- Once, at 1 hour after sunrise, and
- Once, during the day.

If at any time the person monitoring the air concentrations experiences sensory irritation, then the emergency response plan stated in the Fumigation Management Plan must be immediately implemented.

If other problems occur, such as a tarp coming loose, then the appropriate control plan must be activated.

The location and results of the air monitoring must be recorded in the post-application summary report.

Response Information for Neighbours
The supervising fumigant handler (or someone under his/her supervision) must ensure that residences and owners/operators of businesses that meet the criteria have been provided the emergency response information at least **1 week** before fumigation occurs.

Information that must be included:

- The general location of the application block.
- The fumigant(s) applied including the active ingredient, name of the fumigant product(s), and the Product Registration Number.
- Contact information for the supervising fumigant handler and property owner/operator.
- Time period in which the fumigation is planned to take place (must not range more than 4 weeks).
- Early signs and symptoms of exposure to the fumigant(s) applied, what to do and who to call if you believe you are being exposed (911 in most cases).
- How to find additional information about fumigants.
- The method used to share the response information for neighbours must be described in the Fumigation Management Plan and may be accomplished through mail, door hangers, or through other methods that will effectively inform people in residences and businesses within the required distance from the edge of the buffer zone.

9. Label amendments pertaining to the protection of the environment for all end-use products

For all antimicrobial products (current registration number 14588):

Add to DIRECTIONS FOR USE:

DO NOT apply this product to wood that will be used in water.

For all the soil fumigant products:

Add to DIRECTIONS FOR USE:

As this product is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests. DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

Add to ENVIRONMENTAL HAZARD:

Toxic to aquatic organisms. Toxic to small wild mammals.

To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

The use of this chemical may result in contamination of groundwater particularly in areas where soils are permeable (for example, sandy soil) and/or the depth to the water table is shallow.

Appendix III – The Minimum Requirements for Fumigation Management Plan

Each site-specific Fumigation Management Plan must contain the following elements:

1) Applicator information: name, phone number, license number, employer name, employer address, date of completing the appropriate provincial/territorial pesticide applicator certification program.

2) General site information:
   - Application block location, address or global positioning system (GPS) coordinates.
   - Name, address, and phone number of owner/operator of the application block.
   - Map, aerial photo, or detailed sketch showing field location, dimensions, buffer zones, property lines, roads, rights-of-ways, sidewalks, permanent walking paths, bus stops, water bodies, wells, nearby application blocks, surrounding structures (occupied and non-occupied), locations of posted signs for buffers, and sites requiring 200-metre to 400-metre buffer zones (for example, schools, day care establishments, nursing homes, assisted living facilities, hospitals, in-patient clinics, and prisons) with distances from the application site labelled.

3) General application information:
   - Target application date/window
   - Brand name of fumigant
   - Product Registration Number

4) Tarp information and procedures for repair, perforation, and removal (if tarps are used):
   - Brand name, lot number, thickness
   - Name and phone number of person responsible for repairing tarps
   - Schedule for checking tarps for damage, tears, and other problems
   - Maximum time following notification of damage that the person(s) responsible for tarp repair will respond
   - Minimum time following application that tarp will be repaired
   - Minimum size of damage that will be repaired
   - Other factors used to determine when tarp repair will be conducted
   - Name and phone number of person responsible for cutting and/or removing tarps
   - Equipment/methods used to cut tarps
   - Schedule and target dates for cutting tarps
   - Schedule and target dates for removing tarps

5) Soil Conditions:
   - Description of soil texture in application block
   - Method used to determine soil moisture

6) Weather Conditions:
   - Summary of forecasted conditions for the day of the application and the 48 hour period following the fumigant application
   - Wind speed
   - Inversion conditions (for example, shallow, compressed (low-level) temperature inversion)
   - Air stagnation advisory

7) Buffer zones:
   - Application method
   - Application rate from look-up table on label (kilogram active ingredient per hectare)
   - Application block size from look-up table on label (hectares)
   - Credits applied
   - Buffer zone distance
   - Description of areas in the buffer zone that are not under the control of the owner/operator of the application block.

8) Respirators and other personal protective equipment (PPE) for handlers (handler task, protective clothing, respirator type, respirator cartridge type, respirator cartridge replacement schedule, eye protection, gloves and other PPE).

9) Emergency procedures:
   - Evacuation routes
   - Locations of telephones
   - Contact information for first responders
   - Local/provincial/territorial/federal contacts
   - Key personnel
   - Emergency procedures/responsibilities in case of an incident, equipment/tarp/seal failure, complaints or elevated air concentration levels outside buffer zone suggesting potential problems, or other emergencies.

10) Posting requirements (names of persons who will post signs, location of posting signs and procedures for posting and sign removal).

11) Emergency Preparedness and Response (if applicable):
   - Fumigant site monitoring
     - Description of who, when, where, and procedures for monitoring buffer zone perimeter
   - Response information from neighbours
     - List of residences, businesses, and neighbouring property owners informed
     - Name and phone number of person doing notification
     - Method of providing information

12) Description on how the communication will take place between applicator, land owner/operator, and other on-site handlers (tarp cutters/removers, irrigators, etc.) for complying with label requirements (e.g., buffer zone location, buffer zone start/stop times, timing of tarp perforation and removal, personal protective equipment); including the name and phone number of persons contacted and the date contacted.

13) Federal, provincial, territorial and local notification.

14) Authorized on-site personnel:
- Names, addresses and phone numbers of all handlers
- Employer name, address, and phone numbers for all handlers
- Tasks that each handler is authorized and trained to perform
- Date of training for each handler

15) Air monitoring:
- For buffer zone monitoring: (if applicable)
  - Name, address, and, phone number of handler to perform monitoring activities
  - Location and timing of monitoring for the buffer zone
- For handlers without respiratory protection:
  - If sensory irritation is experienced, indicate whether operations will be ceased or operations will continue with respiratory protection
  - If intended to cease operations when sensory irritation is experienced, provide the name, address, and phone number of the handler that will perform monitoring activities prior to operations resuming.
- For handlers with respiratory protection:
  - Representative handler tasks to be monitored
  - Monitoring equipment to be used and timing of monitoring

16) Good Agricultural Practices (GAPs):
- Description of applicable mandatory GAPs (registrants may also include optional GAPs)
- Measurements and other documentation planned to ensure GAPs are achieved (for example, measurement of soil and other site conditions)

17) Description of hazard communication:
- The buffer zone around the application block has been posted in accordance with the label.
- Pesticide product labels and material safety data sheets are on-site and readily available for employees to review.

18) Record keeping procedures:
- The owner/operator of the application block as well as the supervising fumigant handler must keep a signed copy of the site-specific Fumigation Management Plan and the post application summary for 2 years from the date of application.

19) Post-application Summary Report:

Date of the application, application rate, and size of application block fumigated

Summary of weather conditions on the day of the application and during the 48-hour period following the fumigant application

Soil temperature measurement (if air temperatures were above 38 degrees Celsius in any of the 3 days prior to the application)

Tarp damage and repair information (if applicable)

- Location and size of tarp damage
- Description of tarp/tarp seal/tarp equipment failure
- Date and time of tarp repair

Tarp perforation/removal details (if applicable)

- Description of tarp removal (if different than in the Fumigation Management Plan)
- Date tarps were perforated
- Date tarps were removed

Complaint details (if applicable)

- Person filing complaint (for example, on-site handler, person off-site)
- If off-site person - name, address, and phone number of person filing complaint
- Description of control measures or emergency procedures followed after complaint

Description of incidents, equipment failure, or other emergency and emergency procedures followed (if applicable)

Details of elevated air concentrations monitored on-site (if applicable)

- Location of elevated air concentration levels
- Description of control measures or emergency procedures followed

Air monitoring results

- When sensory irritation experienced:
    - Date and time of sensory irritation
    - Handler task/activity
    - Handler location where irritation was observed
    - Resulting action (for example, cease operations, continue operations with respiratory protection)

- When using a direct read instrument:
  - Sample date and time
  - Handler task/activity
  - Handler location
  - Air concentration
  - Sampling method

Date of buffer zone sign removal

Any deviations from the Fumigation Management Plan